



#### PRIVY COUNCIL

MEDICAL RESEARCH COUNCIL MEMORANDUM
No. 23

# NOMENCLATURE OF FUNGI PATHOGENIC TO MAN AND ANIMALS

# NAMES RECOMMENDED FOR USE IN GREAT BRITAIN

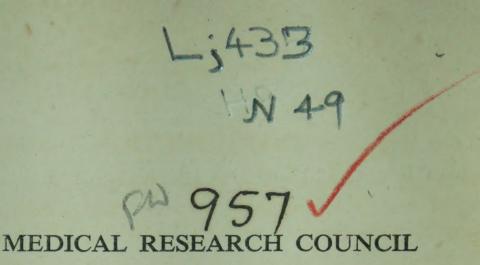
BY
THE MEDICAL MYCOLOGY COMMITTEE
OF THE MEDICAL RESEARCH COUNCIL



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#### INTRODUCTION

MEDICAL mycology is hampered by the multiplicity of names that have been given to fungi of medical importance. A recent census showed that the 65 species of fungi listed as pathogenic to man in the British Isles have been recorded in this country under 150 names and in other countries under many more. To secure greater uniformity the following list of carefully scrutinized names of the commoner British medical fungi has been prepared. In the hope of increasing the usefulness of the list, and because a number of fungi pathogenic to man are primarily parasites of higher animals, the commoner mycoses affecting animals in this country have been included.

The list is based on published British records. It is not a complete list of the pathogenic fungi that have been recorded for this country, nor does it cover tropical mycoses. Most, if not all, of the important endemic pathogenic fungi are listed, however, and several exotic species which are occasionally introduced

into this country have also been included.

#### Fungus Names

To attain uniformity in the nomenclature of any group of organisms it is necessary that the names chosen should be internationally acceptable. Guidance on the choice of acceptable names is given in the International Rules of Nomenclature which are arbitrary codes for the regulation of names. Fungi, being traditionally associated with plants, are covered by the International Rules of Botanical Nomenclature. These Rules are long and rather complex, dealing as they do with the form and choice of names and their valid publication for diverse groups of plants. One of the best known and most frequently invoked rules is probably the "law of priority", by which the legitimate name for an organism when classified in any particular group is the earliest name given to the organism in that group. For example, Bodin's name Trichophyton flavum takes precedence over Trichophyton cerebriforme, which is merely a later name proposed by Sabouraud for the same species. A slightly more complicated example is afforded by the three names Microsporum canis, M. felineum, and M. lanosum, which have been applied to the fungus causing microsporosis in cats and dogs. M. canis must be used because it is the earliest, although it only antedates M. felineum by a few months. The Rules do not take into account the appropriateness of names. The cat may be more frequently infected than the dog, but M. felineum may only be used for the fungus from the cat by an author who believes that different species of Microsporum infect cats and dogs.

This leads to the second consideration in the choice of names. The International Rules give guidance on the selection of names as names. An author using a name in line with the Rules is in a strong position for persuading workers both in his own and other countries to accept his choice of name—provided they accept his views on classification on which the Rules give little help. Taxonomic questions cannot be decided by the mechanical application of a set of rules. They are matters of judgment and the state of knowledge may be such that a final decision cannot be made. The causal agent of favus, for example, is known as *Trichophyton schoenleini* and *Achorion schoenleini*, and both are valid names according to the International Rules. The choice between these two names is one of taxonomy. How should the fungus be classified?

In the opinion of most modern students of the Dermatophytes classification in

the genus Trichophyton is to be preferred.

In this Memorandum the classification to be adopted for different groups has been carefully considered, and for some species a decision has been made only after consultation with specialists in this or other countries. Certain entries have been annotated to indicate reasons for the names selected, but the Actinomycetes and the Dermatophytes call for special comment.

Waksman and Henrici (1943) introduced a new classification of the Actinomycetes in which Actinomyces is reserved for anaerobic forms, the aerobic forms hitherto included in this genus being distributed between Streptomyces and Nocardia according to whether they do or do not produce conidia. This classification has been used here although it is uncertain whether all the species in Nocardia have been correctly classified. It may also be noted that the Actinomycetes are included in the list, even though more properly classified as bacteria, because they are frequently referred to the mycologist for identification. When classified as bacteria, the Actinomycetes are subject to the rules of bacterial nomenclature. The general principles underlying the tentative International Bacteriological Code of Nomenclature (reprinted J. Bact., 1948, 55, 287-306; J. gen. Microbi., 1949, 3, 444-62) do not, however, differ materially from those of the Botanical Rules.

Many different generic names have been proposed for the ringworm fungi, and their taxonomy and nomenclature are confused. Emmons (1934) made a notable simplification by re-establishing the three genera *Microsporum*, *Trichophyton*, and *Epidermophyton*, which exhibit characteristic macroconidia; see also Muende and Webb in MacLeod and Muende (1940, p. 361). Emmons has been followed by Conant *et al.* (1945) and by others, and his classification is accepted here.

#### **Author Citations**

The author citations which accompany Latin binomials are also subject to the International Rules. The function of these citations is to indicate the author proposing the species, and the authority for its transference to a particular genus. For example, Aspergillus fumigatus Fresenius indicates that Fresenius proposed the species under this name; Candida albicans (Robin) Berkhout that the species to which Robin gave the specific epithet albicans was transferred to the genus Candida by Berkhout. The particular importance of the author citations is to guide an inquirer to the origin of a name, so that he can determine the sense in which it was first used: for once a name has been validly proposed it must always be used to include the original sense. The author citations have therefore been carefully checked and they are given in full, although it is customary in all but the most formal context, to cite authorities in abbreviated form.

#### Disease Names

In the selection of names for diseases common usage is the best guide, and international uniformity is therefore correspondingly more difficult to attain. This is not a matter of great significance if a disease name can be equated with one pathogen which bears an internationally acceptable name. Unfortunately this is not always possible. A number of diseases or disease complexes are each caused by several fungi. With increased precision of diagnosis the number of disease complexes should diminish. It is hoped that the disease names recommended will prove generally acceptable, and that it may be possible to omit many of the synonyms in any subsequent revision of this list.

# THE COMMONER FUNGI RECORDED AS PATHOGENIC TO MAN AND ANIMALS IN GREAT BRITAIN, AND THE DISEASES WHICH THEY CAUSE

RECOMMENDED names for the fungi are in semi-bold italic type, rejected names in light italic.

Recommended disease names are in SMALL CAPITALS, rejected names in lower

case roman type.

Where the name of a fungus is mentioned as a cross-reference it is in lower-case roman type; this is not to be taken as indicating its status.

An entry marked by an asterisk (\*) is of a pathogen which is not indigenous

to Great Britain.

For both fungi and diseases, only synonyms commonly used in Great Britain are cited.

### Absidia corymbifera (Cohn) Saccardo and Trotter

The pathogenic status of this species is rather doubtful. It is a common contaminant of human sputum and the skin of horses and other animals and is perhaps a primary parasite in certain ear infections of man.

Achorion gypseum, see Microsporum gypseum.

Achorion quinckeanum, see Trichophyton quinckeanum.

Achorion schoenleini, see Trichophyton schoenleini.

Actinomyces asteroides, see Nocardia asteroides.

Actinomyces bovis Harz

BOVINE ACTINOMYCOSIS

See Actinomyces israeli.

Actinomyces caprae, see Nocardia caprae.

Actinomyces israeli (Kruse) Lachner-Sandoval

HUMAN ACTINOMYCOSIS

According to Erikson (1940), actinomycosis in cattle is caused by a distinct species; unfortunately she was only able to compare human isolates from this country with cattle isolates from Australia and the question needs re-investigation. Erikson used the binomial Actinomyces israeli for the organism causing actinomycosis in man and designated the cattle organism 'Actinomyces bovis Harz', a name which has frequently been applied to the actinomycete of human actinomycosis. McFadyean (1932) and Erikson both concluded that A. bovis is a nomen confusum because it can never be ascertained whether the name was first applied to the organism of actinobacillosis or to that of actinomycosis. If the cattle strains prove to be distinct the question of a new name must be considered. For the time being it is recommended that the strains from man should be regarded as A. israeli, those from animals as A. bovis.

Actinomyces madurae, see Nocardia madurae.

ACTINOMYCOSIS, BOVINE, Actinomyces bovis (but sometimes incorrectly applied to the disease caused by Actinobacillus lignieresi Brumpt).

ACTINOMYCOSIS, HUMAN, Actinomyces israeli.

ASPERGILLOSIS, AVIAN, Aspergillus fumigatus; less frequently A. flavus.

ASPERGILLOSIS, HUMAN, Aspergillus fumigatus.

Aspergillus flavus Link Aspergillus fumigatus Fresenius Aspergillus niger Van Teighem Athlete's Foot, see Tinea pedis.

OTOMYCOSIS; AVIAN ASPERGILLOSIS AVIAN and HUMAN ASPERGILLOSIS **OTOMYCOSIS** 

Blastomyces dermatitidis Gilchrist and Stokes

NORTH AMERICAN BLASTOMYCOSIS

BLASTOMYCOSIS, NORTH AMERICAN, Blastomyces dermatitidis.

CALF RINGWORM, Trichophyton discoides.

Candida albicans (Robin) Berkhout MONILIASIS (including Thrush, etc.)

Syn. Oidium albicans Robin.

Monilia albicans (Robin) Zopf.

Monilia pinoyi Castellani.

The predilection of medical authors for the generic name Monilia is reflected in the name for the disease. It has been frequently pointed out that Monilia is not available for these yeast-like fungi (see Skinner, 1947). The earliest name for this genus is almost certainly Syringospora but in view of the very general use of Candida and of the agreement of medical mycologists attending the Third International Congress for Microbiology, at New York in 1939 to use the latter name Candida is adopted here.

Candida tropicalis (Castellani) Basgal

MONILIASIS

CAT and DOG RINGWORM, Microsporum canis.

\*Coccidioides immitis Rixford and Gilchrist COCCIDIOIDOMYCOSIS, Coccidioides immitis.

COCCIDIOIDOMYCOSIS

Cryptococcosis, see Torulosis.

Cryptococcus farciminosus, see Histoplasma farciminosum.

Cryptococcus meningitidis, see Cryptococcus neoformans.

Cryptococcus neoformans (Sanfelice) Vuillemin

**TORULOSIS** 

Syn. Torulopsis neoformans (Sanfelice) Redaelli.

Debaryomyces neoformans (Sanfelice) Redaelli, Ciferri, and Giordiano.

Cryptococcus meningitidis C. W. Dodge.

Torula histolytica Stoddard and Cutler.

Lodder (1938) advanced arguments in support of the view that Cryptococcus Kuetzing is both a nomen dubium and a nomen confusum, and recommended its replacement by Torulopsis Berlese. Current American usage is to follow Benham (1935) who rejected Torulopsis in favour of Cryptococcus. In the interests of uniformity, the binomial Cryptococcus neoformans is recommended for use in this country also, but because of the difficulty in adjudicating between the claims of the generic names Cryptococcus and Torulopsis this recommendation is made without prejudice to any change in name which may become necessary later.

Debaryomyces neoformans, see Cryptococcus neoformans.

Dhobie itch, see Tinea cruris.

Eczema marginatum, see Tinea cruris.

Epidermophyton cruris, see Epidermophyton floccosum.

Epidermophyton floccosum (Harz) Langeron and Milochevitch TINEA CRURIS, TINEA PEDIS, TINEA UNGUIUM

Syn. Epidermophyton cruris (Castellani) Castellani and Chalmers.

Epidermophyton inguinale Sabouraud.

Epidermophyton inguinale, see Epidermophyton floccosum.

Epidermophyton rubrum, see Trichophyton rubrum.

EPIZOOTIC LYMPHANGITIS (of the horse), Histoplasma farciminosum.

ERYTHRASMA, Nocardia minutissima.

FAVUS (Syn. Tinea favosa), Trichophyton schoenleini; less frequently T. quinckeanum, T. violaceum.

FAVUS, MOUSE, Trichophyton quinckeanum.

Histoplasma capsulatum Darling

HISTOPLASMOSIS

\*Histoplasma farciminosum (Rivolta) Ciferri and Redaelli

EPIZOOTIC LYMPHANGITIS (of the horse)

Syn. Cryptococcus farciminosus Rivolta apud Rivolta and Micellone.

The specific epithet, often incorrectly spelled farcinimosus, is derived from the Latin 'farcininum,' a disease of horses.

HISTOPLASMOSIS, Histoplasma capsulatum.

Lepothrix, see Trichonocardiosis axillaris.

Madura Foot, see Mycetoma.

Malassezia furfur (Robin) Baillon Syn. Microsporon furfur Robin.

PITYRIASIS VERSICOLOR

Microsporon furfur, see Malassezia furfur.

Microsporon minutissimum, see Nocardia minutissima.

Microsporum audouini Gruby

TINEA CAPITIS

Syn. Microsporum felineum Mewborn.

Microsporum lanosum Sabouraud.

These three names are still widely used for the cat and dog ringworm fungus which commonly attacks man, causing tinea capitis (especially in children) and tinea corporis. There is general agreement among systematists that the species described by Bodin (1902) from the dog in France is the same as that described by Mewborn (1902) later in the same year from the cat in New York. Sabouraud (1909) admitted that his *M. lanosum*, which he had described in the previous year, was based on a pleomorphic culture of *M. canis*.

Microsporum felineum, see Microsporum canis.

Microsporum fulvum, see Microsporum gypseum.

Microsporum gypseum (Bodin) Brumpt

TINEA CAPITIS, TINEA CORPORIS

Syn. Achorion gypseum Bodin.

Microsporum fulvum Sabouraud.

Microsporum lanosum, see Microsporum canis.

Monilia albicans, see Candida albicans.

Monilia pinoyi, see Candida albicans.

MONILIASIS (of mucous membranes (including THRUSH), interdigital clefts, nail fold (PARONYCHIA), nails (Onychomycosis), etc.), Candida albicans, C. tropicalis.

мусетома (Syn. Madura Foot), Nocardia madurae.

Myringomycosis, see Otomycosis.

## Nocardia asteroides (Eppinger) Blanchard

NOCARDIOSIS

Syn. Actinomyces asteroides (Eppinger) Gasperini.

Brumpt (1936, p. 1704) describes Eppinger's organism as producing terminal conidia and *Bergey's Manual* (1948, p. 896) states that the mycelium "breaks up into small coccoid conidia".

Nocardia caprae (Silberschmidt) Emmons

NOCARDIOSIS

Syn. Actinomyces caprae (Silberschmidt) Lehmann and Neumann.

\*Nocardia madurae (Vincent) Blanchard

MYCETOMA

Syn. Actinomyces madurae (Vincent) Lehmann and Neumann.

Nocardia minutissima (Burchardt) Verdun

**ERYTHRASMA** 

Syn. Microsporon minutissimum Burchardt.

This organism has not been cultured and its taxonomic position is doubtful.

Nocardia tenuis Castellani

TRICHONOCARDIOSIS AXILLARIS

This organism has not been cultured and its taxonomic position is doubtful.

NOCARDIOSIS, Nocardia asteroides, N.caprae.

NORTH AMERICAN BLASTOMYCOSIS, Blastomyces dermatitidis.

Oidium albicans, see Candida albicans.

Onychomycosis, see Tinea unguium, Moniliasis.

OTOMYCOSIS (Syn. Myringomycosis), Aspergillus flavus, A. niger. See also Absidia corymbifera.

PARONYCHIA, see Moniliasis.

PIEDRA, WHITE, Trichosporon beigeli.

PITYRIASIS ALBA (Syn. Pityriasis sicca, Dandruff), Pityrosporum ovale.

Pityriasis sicca, see Pityriasis alba.

PITYRIASIS VERSICOLOR (Syn. Tinea versicolor), Malassezia furfur.

Pityrosporum malassezi, see Pityrosporum ovale.

Pityrosporum ovale (Bizzozero) Castellani and Chalmers PITYRIASIS ALBA

Syn. Pityrosporum malassezi Sabouraud.

It is uncertain whether *P.ovale* is the cause of this condition with which it is frequently associated.

RHINOSPORIDIOSIS, Rhinosporidium seeberi.

\*Rhinosporidium seeberi (Wernicke) Seeber Ringworm, see Tinea.

RHINOSPORIDIOSIS

SPOROTRICHOSIS, Sporotrichum schencki.

Sporotrichum schencki (Hektoen and Perkins) Matruchot SPOROTRICHOSIS Syn. Sporotrichum beurmanni Matruchot and Ramon.

Syringospora, see Candida.

THRUSH, see Moniliasis.

TINEA BARBAE (Syn. Ringworm of the Beard), Trichophyton mentagrophytes, T.tonsurans.

TINEA CAPITIS (Syn. Head (or Scalp) Ringworm, Tinea tonsurans), Microsporum audouini, M.canis, M.gypseum, Trichophyton discoides, T.flavum, T.mentagrophytes, T.sabouraudi, T.sulphureum, T.tonsurans, T.violaceum.

Tinea circinata, see Tinea corporis.

TINEA CORPORIS (Syn. Body Ringworm, Tinea circinata), Microsporum canis, M.gypseum, Trichophyton discoides, T.interdigitale, T.mentagrophytes, T.persicolor, T.quinckeanum, T.rubrum, T.sulphureum, T.violaceum.

TINEA CRURIS (Syn. Ringworm of the Groin, Eczema marginatum, Dhobie itch), Epidermophyton floccosum, Trichophyton mentagrophytes, T.rubrum.

Tinea favosa, see Favus.

TINEA IMBRICATA (Syn. Tokelau Disease), Trichophyton concentricum.

TINEA PEDIS (Syn. Ringworm of the Feet, Athlete's Foot),
Epidermophyton floccosum, T.interdigitale, T.mentagrophytes,
T.rubrum.

Tinea tonsurans, see Tinea capitis.

TINEA UNGUIUM (Syn. Ringworm of the Nails, Onychomycosis), Epidermophyton floccosum, Trichophyton interdigitale, T.rubrum, T.sabouraudi, T.sulphureum, T.violaceum.

Tinea versicolor, see Pityriasis versicolor.

Tokelau disease, see Tinea imbricata.

Torula histolytica, see Cryptococcus neoformans.

Torulopsis neoformans, see Cryptococcus neoformans.

TORULOSIS (Syn. Cryptococcosis), Cryptococcus neoformans.

Trichomycosis axillaris, see Trichonocardiosis axillaris.

TRICHONOCARDIOSIS AXILLARIS

(Syn. Trichomycosis axillaris, Lepothrix), Nocardia tenuis.

Trichophyton acuminatum, see Trichophyton sabouraudi.

Trichophyton asteroides, see Trichophyton mentagrophytes.

Trichophyton cerebriforme, see Trichophyton flavum.

\*Trichophyton concentricum Blanchard

TINEA IMBRICATA

Syn. Endodermophyton indicum Castellani.

Trichophyton crateriforme, see Trichophyton tonsurans.

Trichophyton discoides Sabouraud TINEA BARBAE, TINEA CAPITIS,
TINEA CORPORIS OF MAN, CALF RINGWORM

Trichophyton flavum Bodin

TINEA CAPITIS

Syn. Trichophyton cerebriforme Sabouraud.

Sabouraud (1910, p. 322) renamed Bodin's species as he considered the specific epithet to be "mediocre".

Trichophyton gypseum, see Trichophyton mentagrophytes.

Trichophyton interdigitale Priestley

TINEA CORPORIS,

TINEA PEDIS, TINEA UNGUIUM

This species is closely related to *T.mentagrophytes* but as it is a recognizable entity it is at present kept distinct.

Trichophyton mentagrophytes (Robin) Blanchard

TINEA BARBAE,

TINEA CAPITIS, TINEA CORPORIS,
TINEA CRURIS, TINEA PEDIS OF MAN,

RINGWORM of DOMESTIC and FARM ANIMALS

Syn. Trichophyton asteroides Sabouraud.

Trichophyton gypseum Bodin.

Trichophyton niveum Sabouraud.

Trichophyton pedis Ota.

Trichophyton niveum, see Trichophyton mentagrophytes.

Trichophyton pedis, see Trichophyton mentagrophytes.

Trichophyton persicolor Sabouraud

TINEA CORPORIS

T.persicolor is near to T.mentagrophytes and may not merit specific rank although it is a constant and recognizable entity in this country.

Trichophyton purpureum, see Trichophyton rubrum.

Trichophyton quinckeanum (Zopf) MacLeod and Muende TINEA CORPORIS, FAVUS in MAN, MOUSE FAVUS

Syn. Achorion quinckeanum Zopf.

Trichophyton rubrum (Castellani) Sabouraud TINEA CORPORIS, TINEA CRURIS, TINEA PEDIS, TINEA UNGUIUM

Syn. Epidermophyton rubrum Castellani.

Trichophyton purpureum Bang.

Trichophyton sabouraudi Blanchard TINEA CAPITIS, TINEA UNGUIUM Syn. Trichophyton acuminatum Sabouraud.

Trichophyton schoenleini (Lebert) Langeron and Milochevitch

Syn. Achorion schoenleini (Lebert) Remak.

Trichophyton sulphureum Colcott Fox

TINEA CAPITIS,

TINEA CORPORIS, TINEA UNGUIUM

The authority for this species is frequently cited as Sabouraud. The facts are these. In December, 1908, Colcott Fox read a paper to the Dermatological Section of the Royal Society of Medicine in which he described this species as the "primrose crater", and suggested that it might be distinguished from *Trichophyton crateriforme* by the term "flavus". This paper was printed in the Proceedings in 1909 (Fox, 1909a), and later in the year was reprinted (Fox, 1909b) in the *British Journal of Dermatology* with fewer illustrations and with the footnote "Sabouraud has kindly suggested to me the name *T.sulphureum*". The name should therefore be attributed to Fox. *T. crateriforme flavum* has been used occasionally in this country for this species.

Trichophyton tonsurans Malmsten

TINEA BARBAE, TINEA CAPITIS,
TINEA CORPORIS

Syn. Trichophyton crateriforme Bodin

Trichophyton violaceum Bodin

FAVUS, TINEA CAPITIS,
TINEA UNGUIUM

Trichosporon beigeli (Rabenhorst) Vuillemin

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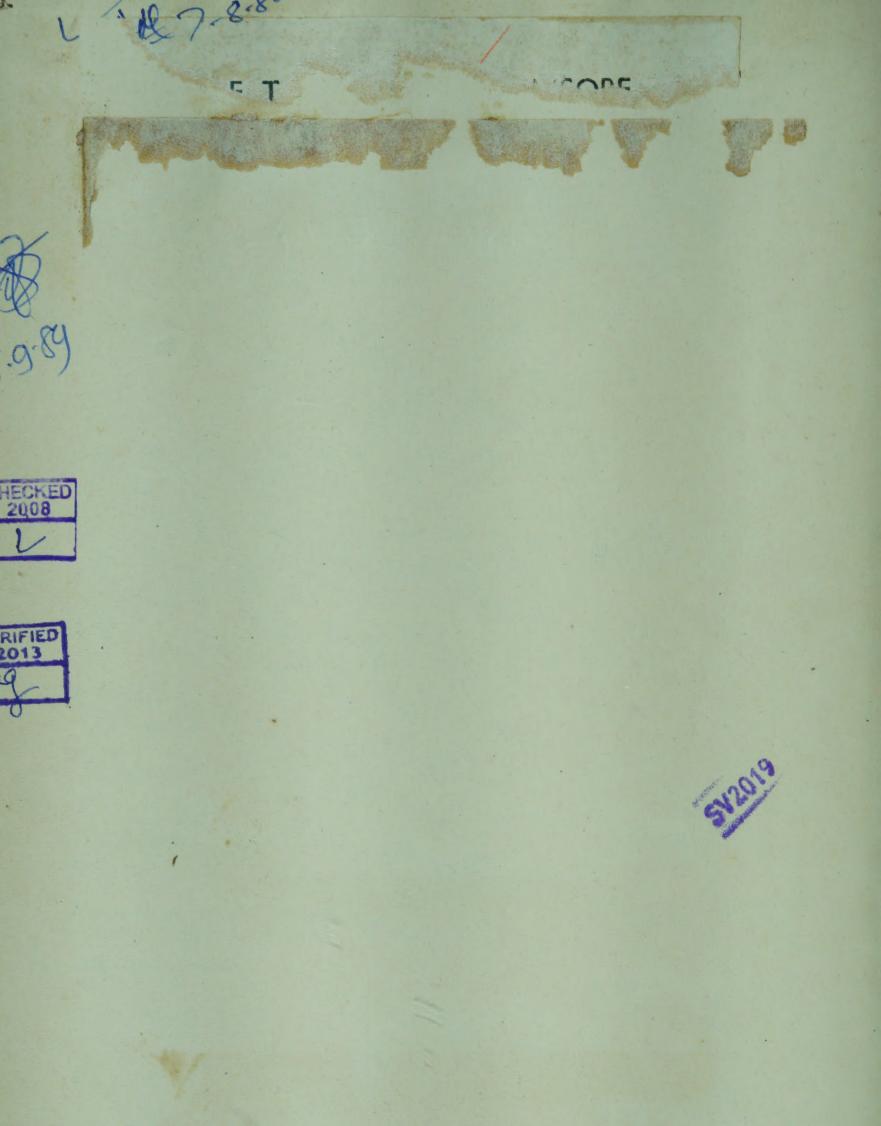
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